

Guthion Residue on Orange Trees
Tulare County, July 1975

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Guthion (azinthosmethyl) is a persistent organophosphate pesticide registered for use on a wide variety of field and orchard crops. On citrus, Guthion is useful against scale insects, thrips, and aphids. The Chemagro Guthion 2S label recommendations call for application as a dilute spray of 1 to 1½ pints of Guthion concentrate (2 pounds actual Guthion per gallon) per 100 gallons, with a maximum of 30 pints (7½ pounds actual Guthion) per acre, or up to 30 pints per acre may be applied as a concentrate or ultra low volume spray. The California worker reentry safety interval is 30 days following Guthion application to citrus. In order to ascertain the persistence of Guthion residue on citrus foliage, a treated test plot was sampled at intervals following application.

Application and Sampling

The application was made to part of an orange grove located near Woodlake, Tulare County, by the University of California Lindcove Field Station on June 17, 1975. The dosage rate was 30 pints of Chemagro Guthion 2S (7½ pounds actual Guthion) per acre in 1500 gallons spray volume. Three samples were collected at each sampling interval by means of a leaf punch. Each sample consisted of 96 leaf discs, 1.8 cm diameter, obtained randomly from four locations on each of twelve adjacent trees. Sampling locations were constant throughout the study. Duplicate samples were analyzed for dislodgeable and penetrated residues; total residue was determined from the third sample. Samples were placed in ice and transported to the laboratory where extraction was completed the day of the sampling.

ANALYTICAL PROCEDURES

Extraction

The procedure used in the extraction of dislodgeable, penetrated, and total residues is detailed in an attachment. Chloroform was used in the total extractions; ethyl acetate in the dislodgeable extractions.

Gas Chromatography

The gas chromatograph was a Varian 2100 series, used under the following conditions:

Detector	- Flame photometric @ 250° C
Column	- 26" x 2 mm I.D. of 3% OV-17 on 100/120 gas chrom Q (Carbowax vapor-deposition treated) @ 22° C
Detector gas	
flow rates	- H ₂ - 100 ml/min
	Air - 80 ml/min
Carrier gas	- N ₂ - 40 ml/min
Guthion retention time	- 5 min

RESULTS

Daily temperature observations made at Lemon Cove are given in Table 1. The average daily high and low temperatures over the study period were 90.3 and 55.5° F. Dislodgeable, penetrated and total leaf residues were given in Table 2. Dislodgeable Guthion residue was around 90. ppm at expiration of the 30 day reentry safety interval. The spray dilution rate of this application was slightly more concentrated than the dilute spray recommended on the label (2 pts/100 gallons vs 1½ pts/100 gallons). Application of Guthion as a concentrate spray is likely to result in far higher foliar residue levels.

TABLE 1

LEMON COVE, TULARE COUNTY, CALIFORNIA

<u>Date</u>	<u>TEMPERATURE °F</u>		<u>PRECIPITATION</u>	
	<u>24 Hours</u>		<u>24 Hour Amounts</u>	
	<u>Ending at 8:00 A.M.</u>		<u>Observation Time 8:00 A.M.</u>	
	<u>Maximum</u>	<u>Minimum</u>		
6/17	93	56		
6/18	85	55		
6/19	80	50		
6/20	78	55		
6/21	81	61		
6/22	93	61		
6/23	89	56		
6/24	81	50		
6/25	78	42		
6/26	82	50		
6/27	90	56		
6/28	91	50		
6/29	93	53		
6/30	94	53		
7/1	91	50		
7/2	87	50		
7/3	88	52		
7/4	89	52		
7/5	90	54		
7/6	92	54		
7/7	97	59		
7/8	96	60		
7/9	94	65		
7/10	91	62		
7/11	101	61		
7/12	102	60		
7/13	99	59		
7/14	97	62		
7/15	98	58		
7/16	87	62		
	<u>Σ90.3</u>	<u>Σ55.5</u>	<u>Total</u>	<u>0</u>

TABLE 2

Guthion Residue on Orange Tree Foliage (ppm)

<u>Time After Application</u>	<u>Dislodgeable Residue</u>	<u>Penetrated Residue</u>	<u>Total Residue</u>
1 hour	268	19.3	283
	210	21.5	
6 days	182	16.8	150
	163	21.3	
13 days	143	19.6	203
	138	21.3	
21 days	147	17.1	129
	121	18.0	
29 days	87.3	10.9	122

DISLODGEABLE GUTHION RESIDUE ppm

1000

100

10

10

20

30

DAYS POST APPLICATION

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